Compatibility of soil moisture remote sensing data of SMOS with ELBARA instrument results - the comparison on long time scale.

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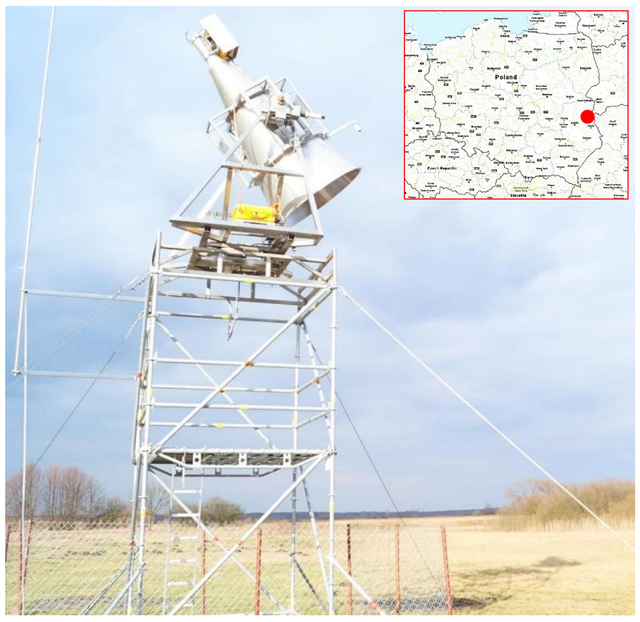
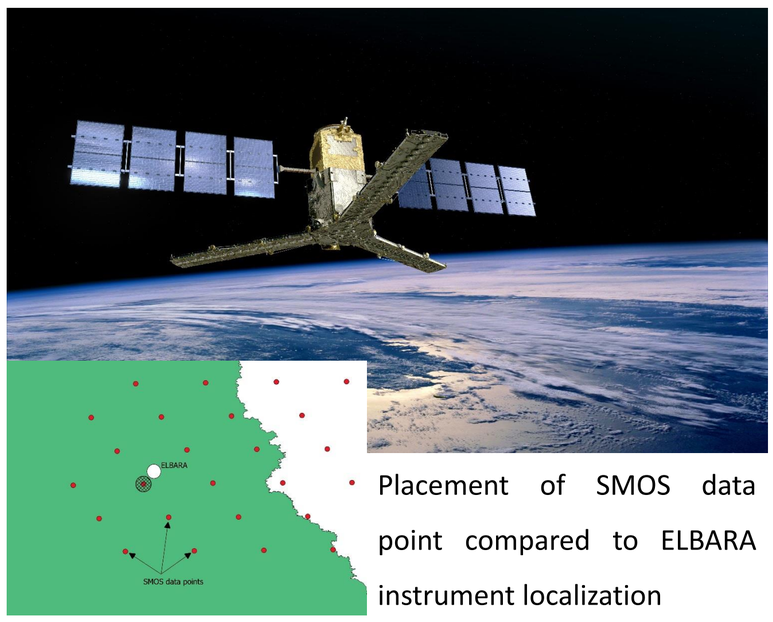
INTRODUCTION

The aim of work was to proceed the results of two year continue measurements from ELBARA instrument with results of SMOS satellite and on site *in-situ* data. Performed research was based on the analyzes of brightness temperatures (T_B) registered for two polarization (vertical and horizontal) by ELBARA instrument and soil moisture (SM) obtained from SMOS satellite (SMUDP2 data product). Data for period 2016 – 2017 were investigated. The timely propagation of TB values and SM were analyzed.





Placement of SMOS data point compared to ELBARA instrument localization

RESULTS

Fig. 1 presents results of T_B measurements for vertical and azimuthal polarization received by ELBARA instrument listed with SM values obtained by SMOS (data point placed nearest to ELBARA site). In general the measured brightness temperature is strongly dependent on the effect of vegetation, litter and interception that is visualized mainly on the differences on period from V 2016 to XII 2016. The differences have no evident correlation with *in-situ* SM measurements and precipitation, as shown on Fig. 2. Considering the results of TB from ELBARA and SMOS (Fig. 3) the lowest ELBARA-SMOS agreement was for the cultivated field, which may be caused by modification (thus diversification) of this area through plant cultivation, mowing and soil ploughing.

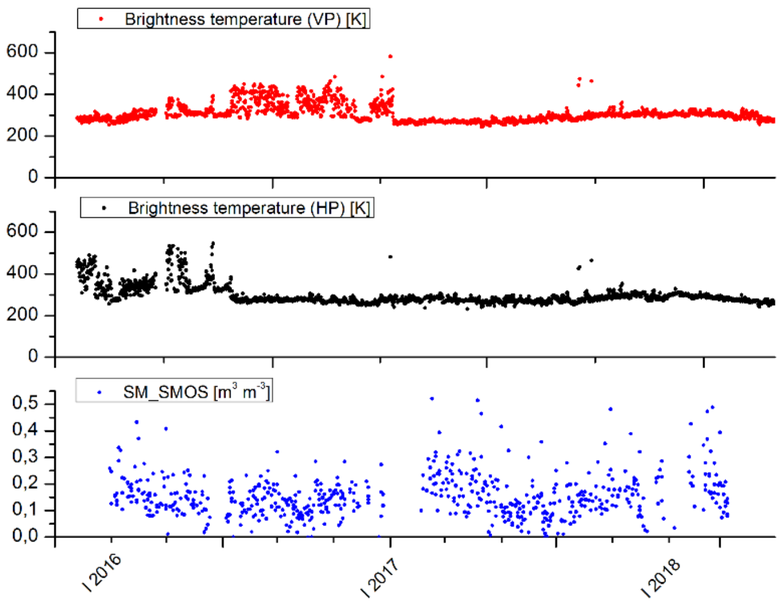


Fig.1 List of results for TB measured for two polarizations by ELBARA and SM values obtained from SMOS.

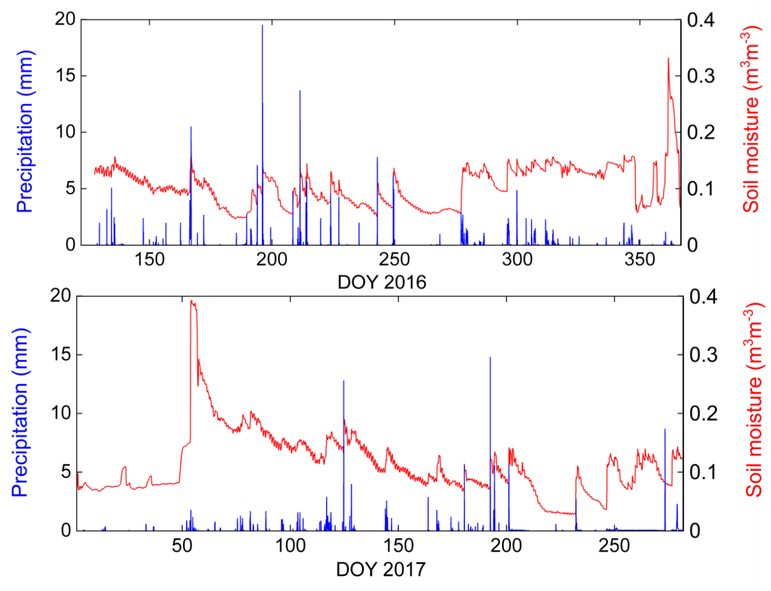


Fig.2 Soil moisture from *in-situ* measurements for 2016 and 2017 in ELBARA measurement site.

CONCLUSIONS

Despite the huge scale difference (single ELBARA footprint covers about 25 m^2, whereas SMOS DGG pixel is approx. 200 km^2), the comparison of the time-series shown some weak and medium correlations. The lowest ELBARA-SMOS agreement was for the cultivated field since for wetland, due to the high level of organic matter and lush vegetation cover, showed only a partial agreement. The meadow appears the best match with SMOS result, which is probably a consequence of meadow-agricultural land cover domination in the examined pixel.

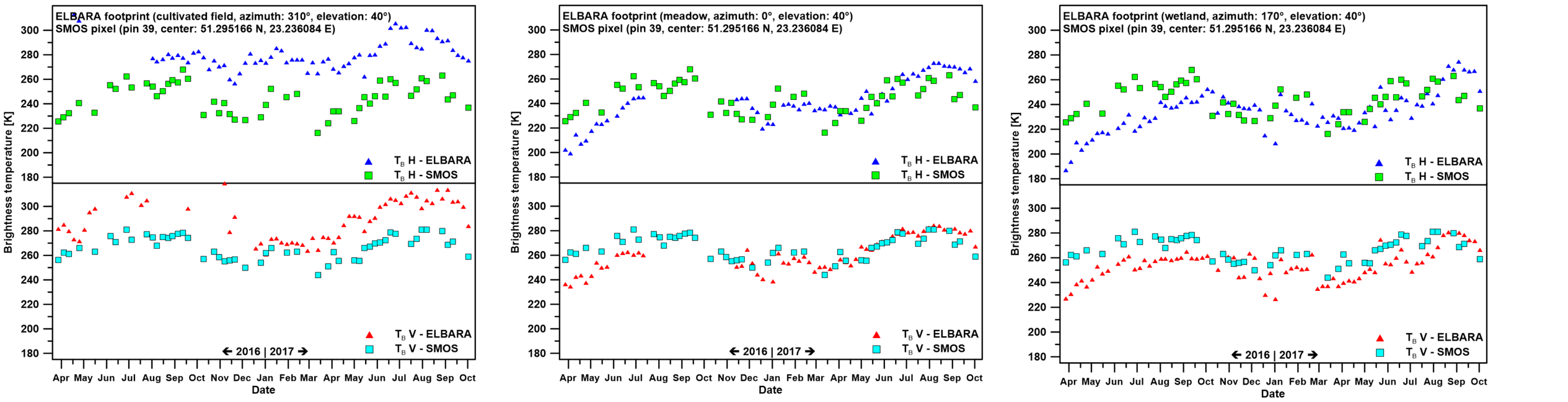


Fig 3. Photos of each study area (upper panel) and comparison of averaged measurements from ELBARA and SMOS (lower panel).

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